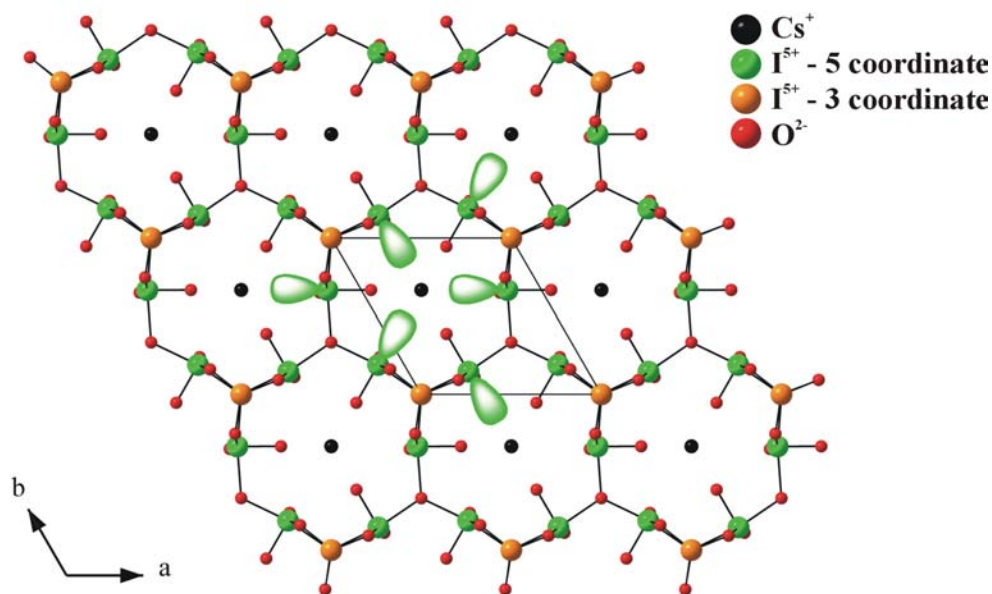


# The Synthesis and Characterization of New Ferroelectric-Second-Harmonic Generating Oxide Materials

P. Shiv Halasyamani, University of Houston: DMR-0092054

The rational design of new solid-state materials remains a challenge for synthetic chemists. This is particularly true with acentric materials. We have developed a synthetic methodology that increases the incidence of acentricity in any new oxide to nearly 50% - far greater than the 15% observed in nature. In doing so, we have synthesized a host of new non-linear optical (NLO) materials. On the right is a new NLO material,  $\text{Cs}_2\text{I}_4\text{O}_{11}$ , synthesized in our laboratory that is an extremely efficient frequency doubler.



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## Education:

Five undergraduates (Joseph Orzechowski, Jolea Bryant, Hyun-Seup Ra, Alex Gittens, and Maria Guardiola), two graduate students (Kang Min Ok and Yetta Porter), and three post-doctoral associates (N.S.P. Bhuvanesh, Joanna Goodey, and Ranbo Yu) contributed to this work. Ms. Porter is currently the RSEC teaching post-doctoral fellow at Wichita State University. Dr. N.S.P. Bhuvanesh is a staff crystallographer at Texas A&M University, Dr. Joanna Goodey and Dr. Yu are on the faculties at Barnard and Beijing Universities respectively.

## Outreach:

The PI is actively involved in both the NSF-REU summer program as well as the NSF-Solid State Chemistry Program. Students involved in the former are Cinttya Chavez, Francisco Escobedo, Jolea Bryant, and Maria Guardiola whereas in the latter program Joseph Orzechowski participated. The majority of the students are from under-represented groups.